



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

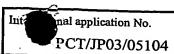
Applicant's or agent's file reference PCT079JST FOR FURTHER ACTION See Notification of Transmittal of Internation Preliminary Examination Report (Form PCT/IPEA/4)						
International application No. PCT/JP2003/005104	International filing date (day		Priority date (day/month/year)			
PCT/JP2003/005104 22 April 2003 (22.04.2003) 27 June 2002 (27.06.2002) International Patent Classification (IPC) or national classification and IPC G01N 13/14						
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY						
 This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. This REPORT consists of a total of4 sheets, including this cover sheet. This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). 						
These annexes consist of a to	stal of 3 sheets					
3. This report contains indications relating to the following items: I Basis of the report II Priority III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV Lack of unity of invention V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI Certain documents cited VII Certain defects in the international application VIII Certain observations on the international application						
Date of submission of the demand Date of completion						
29 August 2003 (29.08.2003) 26 May 2004 (26.05.2004)						
Name and mailing address of the IPEA/JP	Name and mailing address of the IPEA/JP Authorized officer					
Facsimile No.	Tele	Telephone No.				



Inter hal application No.

PCT/JP2003/005104

I. Bas	is of the	report				
1. With regard to the elements of the international application:*						
···						
	7	the international application as originally filed				
	the	escription:				
	page		·15	, as originally filed		
1	page			, filed with the demand		
	page		, filed with the letter of			
	the	laims:				
	- page	1-6,	10,11	, as originally filed		
	page			r with any statement under Article 19		
	page			, filed with the demand		
	page	7,9,12,15-17		09 February 2004 (09.02.2004)		
	1		,			
	-	rawings:				
	page		-10	, as originally filed		
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	the se	uence listing part of the description:				
	- pag	·		as originally filed		
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İ	pag					
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2. Wi	th regai	i to the language, all the elements marked above vional application was filed, unless otherwise indication	vere available or furnished to the	is Authority in the language in which		
Th	ese eler	ents were available or furnished to this Authority in	the following language	which is:		
	the	anguage of a translation furnished for the purposes	of international search (under R	ule 23.1(b)).		
	the	anguage of publication of the international applicat	ion (under Rule 48.3(b)).			
	7	anguage of the translation furnished for the purpo		examination (under Rule 55.2 and/		
		5.3).	, , , , , , , , , , , , , , , , , , ,	(11111111111111111111111111111111111111		
3. W	ith rega	rd to any nucleotide and/or amino acid seque examination was carried out on the basis of the sec	ence disclosed in the interna	tional application, the international		
	con	ained in the international application in written form	n.			
l F	_	together with the international application in comp				
	_	ished subsequently to this Authority in written form				
	7	• •				
	furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the					
_	٦	national application as filed has been furnished.				
L		statement that the information recorded in comp furnished.	outer readable form is identical	to the written sequence listing has		
4.	The	amendments have resulted in the cancellation of:				
		the description, pages				
ļ	$\overline{\boxtimes}$	the claims, Nos. 8,13,14				
	Ħ	the drawings, sheets/fig				
5.	This beyo	report has been established as if (some of) the amond the disclosure as filed, as indicated in the Supple	endments had not been made, s emental Box (Rule 70.2(c)).**	ince they have been considered to go		
in	placeme this rep d 70.17	nt sheets which have been furnished to the receivin ort as "originally filed" and are not annexed t	g Office in response to an invite o this report since they do n	ation under Article 14 are referred to ot contain amendments (Rule 70.16		
1	** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.					



		
•		
laims ·	1-7, 9-12, 15-17	YES
laims		NO
laims	1-7, 9-11	YES
aims	12, 15-17	NO
aims	1-7, 9-12, 15-17	YES
aims		NO
1	laims laims laims laims laims	laims 1-7, 9-12, 13-17 laims 1-7, 9-11 laims 12, 15-17 laims 1-7, 9-12, 15-17

2. Citations and explanations

Document 1: JP, 2001-189359, A (Toshiba Corp.), 10 July, 2001 (10.07.01) (see full text and all drawings) Document 2: JP, 2001-236685, A (Fuji Xerox Co., Ltd.), 31 August, 2001 (31.08.01) (see full text and all drawings)

Document 3: JP, 2002-33618, A (Hitachi Cable, Ltd.), 31 January, 2002 (31.01.02) (especially see paragraph [0019] and [Fig. 1])

Document 4: JP, 11-352002, A (Mitsui Engineering & Shipbuilding Co., Ltd.), 24 December, 1999 (24.12.99) (especially see paragraphs [0011]-[0014] and [Fig. 1]).

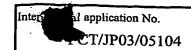
Document 5: JP, 11-120610, A (Tokai University), 30 April, 1999 (30.04.99) (especially see [Claim 4])

The subject matter of claim 12 does not appear to involve an inventive step in view of documents 1 and 2 cited in the ISR and newly cited document 5. Document 1 teaches a light condenser comprising (1) a solid immersion lens, (2) a holder for holding a sample disposed close to the bottom face of the solid immersion lens, and (3) an XYZ-3-axis mechanical stage for controlling the position of the holder. A person skilled in the art could have easily mounted the antenna disposed on the light condensing surface of a solid immersion lens, taught by document 2, on the light condenser of document 1. Furthermore, it is a matter of course to use a solid immersion lens with a high refractive index (dielectric constant) for infrared light, when infrared light is condensed, as described in document 5.

The subject matter of claim 15 does not appear to involve an inventive step in view of documents 1 and 2 cited in the ISR and newly cited document 5. Document 2 ([Fig. 22]) describes a dipole antenna for efficiently generating near-field light. A person skilled in the art could have easily employed a dipole antenna as the antenna mounted on the light condenser of document 1.

The subject matter of claim 16 does not appear to involve an inventive step in view of documents 1, 2 and 4 cited in the ISR and newly cited document 5. The dipole antenna described in document 2 ([Fig. 22]) is triangular. Furthermore, document 4 teaches the matter that the length across an antenna is 1/2 of the wavelength.

INTERNATIONAL PREL NARY EXAMINATION REPORT



Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V.2

The subject matter of claim 17 does not appear to involve an inventive step in view of documents 1-4 cited in the ISR and newly cited document 5. Document 3 describes a slot antenna opposite to a vertex of a triangular window. A person skilled in the art could have easily employed a slot antenna as the antenna mounted on the light condenser of document 1.

The subject matters of claims 1-7 and 9-11 are neither described in any of the documents cited in the ISR or any of the documents newly cited in the IPER, nor obvious to a person skilled in the art.

DT01 Rec'd PCT/PT 2 3 DEC 2004

AMENDMENT

To: Examiner of the patent office

February 09, 2004

1. Identification of the International Application

PCT/JP03/05104

2. Applicant

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4. Item to be Amended

Claims

5. Details of the Amendment

(1) Specification page 17 [Claims], claim 7 (English translation pages 21 and 22, claim 7, change "An infrared light condensing apparatus characterized in that it comprises: a solid immersion lens for accepting an incident light or emitting an outgoing light; an antenna disposed on a base plane of said solid immersion lens; a holder means for retaining a specimen adjacent to said antenna; a position control means for controlling the position of said holder means, whereby operating said position control means allows: the incident light to concentrate as a near-field at a desired position of the specimen retained by said holder means or a near-field from

a desired position of the specimen to be converted into a propagating wave corresponding thereto and then the propagating wave to be emitted as said outgoing light from said solid immersion lens." to read — An infrared light condensing apparatus characterized in that it comprises: a solid immersion lens for accepting an incident light or emitting an outgoing light; said solid immersion lens having a high refractive index in a wavelength region of infrared domain or microwave; an antenna disposed on a base plane of said solid immersion lens; a cantilever for retaining a specimen adjacent to said antenna; a position control means for controlling the position of said cantilever, whereby operating said position control means allows: the incident light to concentrate as a near-field at a desired position of the specimen retained by said cantilever or a near-filed from a desired position of the specimen to be converted into a propagating wave corresponding thereto and then the propagating wave to be emitted as said outgoing light from said solid immersion lens. —

- (2) Specification page 17 [Claims], claim 8 (English translation page 22, claim 8), delete this claim.
- (3) Specification page 17 [Claims], claim 9, line 6 (English translation page 22, claim 9, change "7 or claim 8" to read -7 -.
- (4) Specification page 18 [Claims], claim 12 (English translation page 23, claim 12, change "An infrared light condensing apparatus as set forth in any one of claims 7 to 11, characterized in that said holder means comprises an arm and said position control means comprises a triaxial XYZ mechanical stage." to read - An infrared light condensing apparatus characterized in that it comprises: a solid immersion lens for accepting an incident light or emitting an outgoing light, said solid immersion lens having a high refractive index in a wavelength region of infrared or microwave; an antenna disposed on a base plane of said solid immersion lens; an arm for retaining a specimen adjacent to said antenna; a triaxial XYZ mechanical stage for controlling the position of said arm, whereby operating said triaxial XYZ mechanical stage allows: the incident light to concentrate as a near-field at a desired position of the specimen retained by a near-filed from a desired position of the specimen to be said arm or converted into a propagating wave corresponding thereto and then the propagating wave to be emitted as said outgoing light from said solid

immersion lens-.

- (5) Specification page 18 [Claims], claim 13 (English translation page 23, claim 8), delete this claim.
- (6) Specification page 18 [Claims], claim 14 (English translation page 23, claim 8), delete this claim.
- (7) Specification page 18 [Claims] (English translation page 23), add claim 15 as follows: An infrared light condensing apparatus as set forth in claim12, characterized in that said antenna is a planar dipole antenna or a planar slot antenna disposed on a base plane of said solid immersion lens in a region of its focal position

to condense said incident light upon causing it to geometrically resonate and then to concentrate it as a near-field at said focal position or

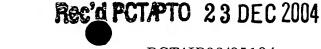
to pick up a near-field from a position of said specimen adjacent to said focal position upon causing it to geometrically resonate and then to emit it as a wave propagating in the medium of said solid immersion lens—.

- (8) Specification page 18 [Claims] (English translation page to follow page 23), add claim 16 as follows: An infrared light condensing apparatus as set forth in claim 15, characterized in that said planar dipole antenna is a bowtie antenna made of a pair of essentially triangular electric conductors whose apexes are opposed to each other at a small distance less than a diffraction limit of said incident or outgoing light, the bowtie antenna having a total length that is one half of an effective wavelength of said incident or outgoing light.— .
- (9) Specification page 18 [Claims] (English translation page to follow page 23), add claim 17 as follows: An infrared light condensing apparatus as set forth in claim 15, characterized in that said planar slot antenna is a bowtie antenna made of an electric conductor having a pair of generally triangular windows formed therein whose apexes are opposed to each other at a small distance less than a diffraction limit of said incident or outgoing light, the bowtie antenna having a total length that is one half of an effective wavelength of said incident or outgoing light.— .

6. List of Papers Attached:

(1) Specification, substitute sheet pages 17, 18 and 18/1 (English

translation substitute sheet pages 21-24.

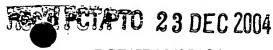


and then to emit it as a wave propagating in the medium of said solid immersion lens.

4. An infrared light condensing apparatus as set forth in any one of claims 1 to 3, characterized in that the tip of said probe is a sharply pointed edge of a rod-like electric conductor having a radius of curvature less than a diffraction limit of said incident or outgoing light and is configured to project from said electric conductor towards said specimen

to cause the geometrically resonating incident light condensed on said antenna to concentrate as a near-field at said probe tip or to take out a near-field from a surface of said specimen.

- 5. An infrared light condensing apparatus as set forth in any one of claims 1 to 4, characterized in that said holder means comprises an arm and said position control means comprises a triaxial XYZ mechanical stage.
- 6. An infrared light condensing apparatus as set forth in any one of claims 1 to 4, characterized in that said holder means comprises a cantilever having a rear face reflecting an incident laser light and said position control means is adapted to respond to a change in angle of reflection of the laser light at the cantilever rear face for controlling the distance between said probe tip and the surface of said specimen.
- 7. An infrared light condensing apparatus characterized in that it comprises:
- a solid immersion lens for accepting an incident light or emitting an outgoing light;
- an antenna disposed on a base plane of said solid immersion lens;
- a holder means for retaining a specimen adjacent to said antenna;
 - a position control means for controlling the position of said



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holder means,

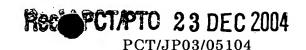
whereby operating said position control means allows:

the incident light to concentrate as a near-field at a desired position of the specimen retained by said holder means or

a near-filed from a desired position of the specimen to be converted into a propagating wave corresponding thereto and then the propagating wave to be emitted as said outgoing light from said solid immersion lens.

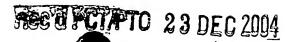
- 8. An infrared light condensing apparatus as set forth in claim 7, characterized in that said solid immersion lens is composed of a medium that is low in absorption coefficient and large in dielectric constant for wavelengths of said incident or outgoing light.
- 9. An infrared light condensing apparatus as set forth in claim 7 or claim 8, characterized in that said antenna is a planar dipole antenna or a planar slot antenna disposed on a base plane of said solid immersion lens in a region of its focal position
- to condense said incident light upon causing it to geometrically resonate and then to concentrate it as a near-field at said focal position or
- to pick up a near-field from a position of said specimen adjacent to said focal position upon causing it to geometrically resonate and then to emit it as a wave propagating in the medium of said solid immersion lens.
- 10. An infrared light condensing apparatus as set forth in claim 9, characterized in that said planar dipole antenna is a bowtie antenna made of a pair of essentially triangular electric conductors whose apexes are opposed to each other at a small distance less than a diffraction limit of said incident or outgoing light, the bowtie antenna having a total length that is one half of an effective wavelength of said incident or outgoing light.
 - 11. An infrared light condensing apparatus as set forth in





- claim 9, characterized in that said planar slot antenna is a bowtie antenna made of an electric conductor having a pair of generally triangular windows formed therein whose apexes are opposed to each other at a small distance less than a diffraction limit of said incident or outgoing light, the bowtie antenna having a total length that is one half of an effective wavelength of said incident or outgoing light.
- 12. An infrared light condensing apparatus as set forth in any one of claims 7 to 11, characterized in that said holder means comprises an arm and said position control means comprises a triaxial XYZ mechanical stage.
- 13. An infrared light condensing apparatus as set forth in any one of claims 7 to 11, characterized in that said holder means comprises a cantilever having a rear face reflecting an incident laser light and said position control means is adapted to respond to a change in angle of reflection of the laser light at the cantilever rear face for controlling the distance between said antenna and the surface of said specimen retained by said cantilever.
- 14. An infrared light condensing apparatus as set forth in any one of claims 1 to 13, characterized in that said incident or outgoing light is an infrared light or microwave.





PCT

国際予備審査報告

REC'D 17 JUN 2004 WIPO PCT

(法第12条、法施行規則第56条) (PCT36条及びPCT規則70)

出題人又は代理人 の書類記号 PCT079 J S T 「PEA/416)を参照すること。				
国際出願番号 PCT/JP03/05104	国際出願日 (日.月.年) 22.	04. 2003	優先日 (日.月.年) 27. (6. 2002
国際特許分類(IPC) Int. Cl ⁷	G01N13/1	4		
出願人(氏名又は名称)	独立行政法人科学	技術振興機構		
1. 国際予備審査機関が作成したこの				Éい送付する。
2. この国際予備審査報告は、この表			ジからなる。	
図 この国際予備審査報告には、 査機関に対してした訂正を含 (PCT規則70.16及びPC) この附属書類は、全部で	む明細番、開来の純田A 「実施細則第607号参	及ひ/ 又は図画 5歳 注照)	基礎とされた及び/又に 付されている。 	まこの国際予備審
3. この国際予備審査報告は、次の内	容を含む。	•		
I x 国際予備審査報告の基	遊	•		
Ⅱ □ 優先権	•	,		·
Ⅲ Ⅲ 新規性、進歩性又は産	業上の利用可能性につい	いての国際予備審査	報告の不作成	
IV 開の単一性の欠如	• •	•	· ·	
V x PCT35条(2)に規定 の文献及び説明 VI ある種の引用文献	≧する新規性、進歩性又	は産業上の利用可能	8性についての見解、そ	れを要付けるため
VII 国際出願の不備				-
VII 国際出願に対する意見				
			, .	
;				
国際予備審査の請求告を受理した日 29.08.200	3	国際予備審査報告	を作成した日 26.05.20	0 4
名称及びあて先	·	特許庁審査官(権	限のある職員)	2 J 3 2 1 0
日本国特許庁 (IPEA/J 郵便番号100-891	5	遠藤	幸徳 印)	
東京都千代田区酸が関三丁目	4番3号	GOOD OF THE PARTY	2501-1101	为線 3251

電話番号 03-3581-1101 内線







I.	Œ	感予備審查報行	告の基礎・			
1.	1. この国際予備審査報告は下記の出願書類に基づいて作成された。 (法第6条 (PCT14条) の規定に基づく命令に 応答するために提出された差し替え用紙は、この報告書において「出願時」とし、本報告書には添付しない。 PCT規則70.16,70.17)					
		出願時の国際	出願書類			
	x	明細書	第 <u>1-15</u> 第 第	_ ページ、 _ ページ、 _ ページ、	出願時に提出されたもの 国際予備審査の請求 各と	
	x	請求の範囲 請求の範囲	第 <u>1-6, 10, 11</u> 第 第 <u>7, 9, 12, 15-17</u>		出願時に提出されたもの PCT19条の規定に基 国際予備審査の請求告と 09.02.2004	うつき補正されたもの
	x	図面	第1-10	_ ページ/ 図、 _ ページ/図、 _ ページ/図、) : 共に提出されたもの 付の書簡と共に提出されたもの
			表の部分 第 表の部分 第 表の部分 第	_ページ、 _ページ、 _ページ、 _ページ、	出願時に提出されたもの 国際予備審査の請求告と	
2		上記の出願書類	何の言語は、下記に示す場合を	≿除くほか、こ	の国際出願の言語である。	
	_	上記の甞類は、	下記の言語である	語であ	ప .	
	□ 国際調査のために提出されたPCT規則23.1(b)にいう翻訳文の言語 □ PCT規則48.3(b)にいう国際公開の言語 □ 国際予備審査のために提出されたPCT規則55.2または55.3にいう翻訳文の言語					
3	. ,	この国際出願は	は、ヌクレオチド又はアミノ酢	韓配列を含んで	おり、次の配列表に基づき	き国際予備審査報告を行った。
□ この国際出願に含まれる書面による配列表 □ この国際出願と共に提出された磁気ディスクによる配列表 □ 出願後に、この国際予備審査(または調査)機関に提出された書面による配列表 □ 出願後に、この国際予備審査(または調査)機関に提出された磁気ディスクによる配列表 □ 出願後に提出した書面による配列表が出願時における国際出願の開示の範囲を超える事項を含まない旨の陳述書の提出があった □ 書面による配列表に記載した配列と磁気ディスクによる配列表に記録した配列が同一である旨の陳述書の提出があった。						
4		明細書	F記の告類が削除された。 第 第 <u>8,13,14</u> 図面の第	ページ 項 ペー	・ジ/図	
5	5. □ この国際予備審査報告は、補充欄に示したように、補正が出願時における開示の範囲を越えてされたものと認められるので、その補正がされなかったものとして作成した。(PCT規則70.2(c) この補正を含む差し替え用紙は上記1.における判断の際に考慮しなければならず、本報告に添付する。)					



国際予備審查報告

国際出願番号 PCT/JP03/05104

1-7, 9-12, 15-17

v.	新規性、進歩性又は産業上の利用可能性につい 文献及び説明	ての法第12条	(PCT35条(2))	に定める見解、 <i>-</i> 	それを裏付ける
1.	見解				
窘	f規性(N)	請求の範囲 _ 請求の範囲 _	1-7, 9-	12, 15-1	7 有 無
¥	基歩性(I _. S)	請求の範囲 請求の範囲 _		, 9-11 15-17	

請求の範囲

請求の範囲

文献及び説明(PCT規則70.7)

産業上の利用可能性 (IA)

文献1: JP 2001-189359 A (株式会社東芝)、 2001. 07. 10

(全文、全図を参照されたい。)

JP 2001-236685 A (富士ゼロックス株式会社)、2001.08.31

(全文、全図を参照されたい。) JP 2002-33618 A (日立電線株式会社)、

2002. 01. 31

(特に、段落番号【0019】、 【図1】を参照されたい。)

文献4: JP 11-352002 A (三井造船株式会社)、

1999. 12.

(特に、段落番号【0.011】~【0014】、【図1】を参照された

文献 5: JP 11-120610 A (学校法人東海大学) 1999.04.30 (特に、【請求項4】を参照されたい。)

請求の範囲12に係る発明は、国際調査報告で引用された文献1及び文献2と新た に引用した文献5とにより進歩性を有しない。文献1には、ソリッドイマージョンレンズと、ソリッドイマージョンレンズの底面に近接して配置された試料を保持する保 方式では、ファットイマーションレンスの庭園に近接して配置された試料を保持する保持具と、この保持具の位置を制御するXYZー3軸メカニカルステージとを有した集光装置が教示されている。文献2により教示された、ソリッドイマージョンレンズの集光面に配置されたアンテナを、文献1の集光装置に搭載することは当業者にとって容易である。そして、文献5に記載されたように赤外光を集光する際には、赤外光に対して屈折率(誘電率)の高いソリッドイマージョンレンズを用いることは当然のこれです。 とである。

請求の範囲15に係る発明は、国際調査報告で引用された文献1及び文献2と新た に引用した文献5とにより進歩性を有しない。文献2【図22】には、効率よく近接 場光を発生させるためのダイポールアンテナが記載されている。文献1の集光装置に 搭載するアンテナをダイポールアンテナとすることは当業者にとって容易である。

請求の範囲16に係る発明は、国際調査報告で引用された文献1、文献2及び文献 4と新たに引用した文献5とにより進歩性を有しない。文献2【図22】に記載されたダイポールアンテナは三角形である。また、文献4にはアンテナの差し渡し長を波長の1/2にする事項が教示されている。



国際予備審查報告

国際出願番号 PCT/JP03/05104

補充欄 (いずれかの欄の大きさが足りない場合に使用すること)

第 V.2 欄の続き

請求の範囲17に係る発明は、国際調査報告で引用された文献1乃至文献4と新たに引用した文献5とにより進歩性を有しない。文献3には、三角形の窓の頂点を対向させたスロットアンテナが記載されている。文献1の集光装置に搭載するアンテナをスロットアンテナとすることは当業者にとって容易である。

請求の範囲1乃至7、及び9乃至11に係る発明は、国際調査報告で列記した文献、及び国際予備審査報告で新たに引用した文献のいずれにも記載されておらず、当業者にとって自明なものではない。

- 5. 前記保持具がアームであり、前記位置制御手段がXYZ-3軸メカニカルステージであることを特徴とする、請求項1~4のいずれかに記載の赤外光集光装置。
- 6. 前記保持具がカンチレバーであり、このカンチレバーの背面に当てられたレーザー光の反射角の変化により、前記位置制御手段が前記プローブ先端と前記試料表面との距離を制御することを特徴とする、請求項1~4のいずれかに記載の赤外光集光装置。
- 7. (補正後)入射光を入力するまたは出射光を出力する、赤外光領域又はマイクロ波帯域で大きな屈折率を有するソリッドイマージョンレンズと、このソリッドイマージョンレンズの底面に配設したアンテナと、このアンテナに近接して配設した試料を保持するカンチレバーと、このカンチレバーの位置を制御する位置制御手段とを有し、

上記位置制御手段を操作して、上記カンチレバーに保持した試料の所望の位置 に上記入射光を近接場として集中する、または、上記試料の所望の位置からの近 接場を伝搬波に変換して上記ソリッドイマージョンレンズから上記出射光として 出力することを特徴とする、赤外光集光装置。

8. (削除)

9. (補正後) 前記アンテナは、平面ダイポールアンテナまたは平面スロットアンテナであり、前記ソリッドイマージョンレンズの底面上の焦点位置に配設され、前記入射光を幾何学的に共鳴させて集光し上記焦点位置に近接場として集中する、または、前記試料の上記焦点位置近傍の近接場を幾何学的に共鳴してピックアップし、上記ソリッドイマージョンレンズの媒質中に伝搬波として放射することを特徴とする、請求項7に記載の赤外光集光装置。

- 10. 前記平面ダイポールアンテナは、略三角形の2つの導体の頂点を、前記入射光または出射光の回折限界以下の微細距離を離して対向させたポータイアンテナであり、かつ、このポータイアンテナの差し渡し長が上記入射光または出射光の有効波長の1/2であることを特徴とする、請求項9に記載の赤外光集光装置。
- 11. 前記平面スロットアンテナは、導体に開けられた略三角形の2つの窓の頂点を前記入射光または出射光の回折限界以下の微細距離を離して対向させたボータイアンテナであり、かつ、このボータイアンテナの差し渡し長が上記入射光または出射光の有効波長の1/2の長さであることを特徴とする、請求項9に記載の赤外光集光装置。
- 12. (補正後)入射光を入力するまたは出射光を出力する、赤外光領域又はマイクロ波帯域で大きな屈折率を有するソリッドイマージョンレンズと、このソリッドイマージョンレンズの底面に配設したアンテナと、このアンテナに近接して配設した試料を保持するアームと、このアームの位置を制御するXYZ-3軸メカニカルステージとを有し、

上記XYZ-3軸メカニカルステージを操作して、上記アームに保持した試料の所望の位置に上記入射光を近接場として集中する、または、上記試料の所望の位置からの近接場を伝搬波に変換して上記ソリッドイマージョンレンズから上記出射光として出力することを特徴とする、赤外光集光装置。

- 13. (削除).
- 14. (削除)
- 15. (追加) 前記アンテナは、平面ダイポールアンテナまたは平面スロットアンテナであり、前記ソリッドイマージョンレンズの底面上の焦点位置に配設され、前記入射光を幾何学的に共鳴させて集光し上記焦点位置に近接場として

集中する、または、前記試料の上記焦点位置近傍の近接場を幾何学的に共鳴して ピックアップし、上記ソリッドイマージョンレンズの媒質中に伝搬波として放射 することを特徴とする、請求項12に記載の赤外光集光装置。

- 16. (追加) 前記平面ダイポールアンテナは、略三角形の2つの導体の頂点を、前記入射光または出射光の回折限界以下の微細距離を離して対向させたボータイアンテナであり、かつ、このボータイアンテナの差し渡し長が上記入射光または出射光の有効波長の1/2であることを特徴とする、請求項15に記載の赤外光集光装置。
- 17. (追加) 前記平面スロットアンテナは、導体に開けられた略三角形の2つの窓の頂点を前記入射光または出射光の回折限界以下の微細距離を離して対向させたボータイアンテナであり、かつ、このボータイアンテナの差し渡し長が上記入射光または出射光の有効波長の1/2であることを特徴とする、請求項15に記載の赤外光集光装置。

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